of teaching, and to reinvigorate him for indoor work. It was thus that he planned his last trip to Bear Mountain to view the total eclipse of the sun on January 24. The temperature was below zero, and he was thoroughly chilled, so that he had a bad cold when he returned. He taught the following week, but gave up on Friday night. Pneumonia developed, and he died quietly on the evening of February 2. He was the only child of his parents and never married, so he left no near relatives, except two aged aunts in the West.

By the terms of his will his library and collections are given to the New England Botanical Club where they will be of very great value to bryological students. His other property was left to Bowdoin College.

HINGHAM, MASSACHUSETTS.

PONTEDERIA VERSUS UNISEMA.

M. L. FERNALD.

IN recent years the American genus which has long passed as *Pontederia* L. has begun to appear in American botanical literature as *Unisema* Raf., and the common Pickerelweed of eastern America as *Unisema cordata* (L.) Farwell.[1] Since the proposition to relegate the name *Pontederia* to the Asiatic and Australian genus *Monochoria* Presl and to use for the American genus Rafinesque's name *Unisema* is not new and since there are valid arguments both for and against such a procedure it may be clarifying to look into the history of the Linnean genus *Pontederia*. As it appeared in the *Species Plantarum* (1753), *Pontederia*[2] had three species: (1) *P. ovata* of Malabar, which had been described and illustrated by Rhede, a plant with 1 stamen and consequently included by Linnaeus through error in his *Pontederia*, a genus which he placed in the class *Hexandria;* (2) *P. cordata*, the *Pontederia* of Linnaeus's *Hortus Cliffortianus* (1737), Gronovius's *Flora Virginica* (1739), etc., the Pickerelweed of eastern America, with dense spikes and with 1-seeded indehiscent fruits; and (3) *P. hastata* of India, the *Pontederia* of Linnaeus's *Flora Zeylanica* (1747) or the *Carim gola* of Rhede, a plant with umbels of flowers and with 3-valved many-seeded capsules.

[1] Farwell, Papers Mich. Acad. Sci. Arts and Lett. iii. 91 (1923).

[2] Sp. Pl. i. 288 (1753).

The description of the genus *Pontederia* in the 5th edition of the *Genera Plantarum* (1754) was a mixture based upon the 2nd and 3rd species of the *Species Plantarum;* but in general the name has been maintained by post-Linnean botanists for the American *Pontederia cordata;* Linnaeus's 1st species, *P. ovata,* clearly not belonging in the class *Hexandria,* being excluded as a member of the family *Marantaceae,* and the 3rd species, *P. hastata,* separated off as *Monochoria* Presl. Rafinesque[1] raised the point, that the generic description of Linnaeus called for "*Capsula* carnosa, conica, apice late inflexo, trilocularis, triangularis, trisulca. SEM. subrotunda, plurima," which could apply only to his 3rd species, *P. hastata,* and that, therefore, *Monochoria* must be called *Pontederia* and *P. cordata,* with an indehiscent 1-seeded fruit, must belong to the new genus *Unisema* Raf. In thoroughly characteristic style Rafinesque scored Nuttall and others who maintained *Pontederia* for *P. cordata:* "All the servile American botanists, and even Torrey, who has verified the fruit, have followed this absurdity." Nevertheless not only practically all the "servile" American botanists since Rafinesque but such Europeans as Kunth, Bentham & Hooker, Solms-Laubach, Schönland, and even Otto Kuntze, have maintained *Pontederia* for the 1-seeded American group and have treated the many-seeded *P. hastata* as *Monochoria.* But since Farwell (l. c.) now revives *Unisema* for *P. cordata* it is evident that the reasoning which has appealed to the principal systematic botanists since Linnaeus needs statement.

That Linnaeus did not have a clear understanding of the floral structure of the plants he assembled under *Pontederia* is apparent from his three species: *P. ovata* with 1 stamen but put by Linnaeus into a hexandrous genus; *P. cordata* with six stamens and a 1-seeded indehiscent utricle; and *P. hastata* with six stamens and a many-seeded 3-valved capsule. Linnaeus's lack of understanding of the real floral structure of these plants is further exemplified by his editing of Loefling's *Iter Hispanicum* (1758) in which he reduced Loefling's manuscript genus *Phrynium,* with 3 stamens, without comment to his own supposedly hexandrous *Pontederia.* In other words, to say that Linnaeus, in the *Species Plantarum* and later, meant one of these plants rather than another as the "type" of *Pontederia* is futile; to him *Pontederia* was a group of superficially similar but structurally quite dissimilar plants and properly to understand what he originally

[1] Raf. Journ. de Phys. lxxxix. 261 (1819) and Med. Fl. ii. 105 (1830).

meant by the name it is necessary to trace *Pontederia* to its source. This, fortunately, is simpler than many nomenclatorial problems which lead back of 1753.

The name *Pontederia* seems to have started in 1737 when, in the 1st edition of the *Genera,* Linnaeus gave the same mixed description as in the 5th, the capsules 3-valved and many-seeded, but, stated that the plant was communicated by Gronovius (from Virginia). Simultaneously Linnaeus published *Pontederia* in *Hortus Cliffortianus* (1737), a plant with "floribus spicatis" which "*Crescit in aquaticis* Marilandiae & Virginiae" and identified with plates of the Virginian plant published by Petiver, Morison and Plukenet. Then, as a wholly secondary matter, he treated as probably congeneric with the Virginian species the Indian plant with 3-valved capsules and many seeds, saying: "*Hujus generis videtur Carim-golo Hort. mal.* 11. p. 91. t. 44." And at this time, dealing primarily with the American plant, but associating with it as an apparently congeneric element the Indian species, Linnaeus gave the dedication of the name *Pontederia:*

"*Dixi hoc plantae genus a* JULIO PONTEDERA, *in Gymnasio Patavino Botanices Professore, Compendii Tabularum botanicarum, Dissertationum de floribus compositis & doctissimae Anthologiae auctore; ubi in examinando partes fructificationis paucos pares habuit.*"[1]

The confusion of the two plants, the Virginian with indehiscent 1-seeded fruits, the Indian with dehiscent many-seeded capsules, certainly entered into the original account of *Pontederia;* but at the time of dedicating the genus to Pontedera Linnaeus had chiefly in mind the plant of Maryland and Virginia. This fact is definitely established by his citations under the primary account, both in the *Genera* (1737) and in *Hortus Cliffortianus* (1737), of Morison, Gronovius, Petiver and Plunkenet, all of whom had the American Pickerelweed. This intent of Linnaeus is further made evident in the *Genera* ed. 5 (1754). There the mixed generic description of earlier editions is repeated and the only change is the insertion of the generic synonym "Michelia *Houst. A. A.*" This refers to the subsequently published *Michelia* Houst. Rel. Houst. (1781), a tropical American plant with 1-seeded fruits and clearly congeneric with *Pontederia cordata.*

In view of this historic evidence it is certain that there is good justification for maintaining *Pontederia* as Linnaeus originally intended it, for the American Pickerelweed,[2] even though Linnaeus

[1] L. Hort. Cliff. 133 (1737).

[2] Since this paper was prepared Mr. T. A. Sprague has reached the same conclusion, by the same course of reasoning. See Journ. Bot. lxii. 327 (1924).

himself confused the situation by merging with it members of three other genera (including another family) and describing the fruit of the Indian plant. As stated in Article 45 of the International Rules: "If the genus contains a section or some other division which, judging by its name or its species, is the type or the origin of the group, the name is reserved for that part of it." If, however, it is argued that from the start the generic description of *Pontederia* belonged as much to *P. hastata* as to *P. cordata* and that the two have equal claims to the generic name, it is important to note that ever since Linnaeus the overwhelming majority of botanists have treated the former as *Monochoria* and the latter as *Pontederia*. It is, therefore, incumbent upon those who desire plant nomenclature to remain generally intelligible to maintain this usage for, as clearly stated in the International Rules (Art. 5), "where the consequences of rules are doubtful, established custom becomes law."

The Pickerelweed of the northern United States and southern Canada, ranging southward to Virginia, Missouri and Kansas, more locally to northern Florida and Oklahoma, has very dense spikes, its blue-purple flowers white-villous especially before anthesis, its mature fruits 6–10 mm. long and its obovoid reddish seed 3.5–4.5 mm. long, 2–2.5 mm. in diameter. Its leaf-blades are comparatively soft, of very variable outline, the upper or cauline leaf with a slender petiole (above the sheath) averaging 4.5 cm. long.[1] This plant is *Pontederia cordata* L.

In tropical and subtropical eastern America the plant which passes as *Pontederia cordata* has firmer or harder foliage, the cauline leaves usually on shorter petioles (averaging 2.7 cm. long).[2] Its spike is looser-flowered than in the northern plant; its flowers are rather smaller and, instead of being white-villous, are glandular-dotted and sometimes hirtellous, in age often quite glabrate. Such mature fruits as have been available are 5–6 mm. long and the seeds 2.7–3.2 mm. long, 1.8–2 mm. in diameter. This plant has been examined from Paraguay, Brazil and Cuba and in the United States from Florida to Texas and northward to Virginia. Its narrow-leaved extreme was beautifully characterized by Nuttall as *P. lanceolata*[3] from Georgia and South

[1] Measurements of 60 specimens show a range of 1.5–12 cm. with an average of 4.5 cm.

[2] Measurements of 25 specimens show a general range from 0.5–3, very rarely to 14 cm., with an average of 2.7 cm.

[3] Nutt. Gen. i. 216 (1818).

Carolina, Nuttall specially emphasizing the "petiole very short," leaf "very opaque, in *P. cordata* the leaf is diaphanous when held to the light," and "unexpanded flowers and filaments of the stamina thickly covered with round, blackish, glandular atoms." The broader-leaved form of *P. lanceolata* has been characterized as *P. cordata,* forma *brasiliensis* Solms.[1]

The Pontederias of temperate North America may be distinguished by the following key:

a. Spike dense: young and commonly the mature flowers white-villous: mature fruits 6–10 mm. long: seeds 3.5–4.5 mm. long, 2–2.5 mm. in diameter: leaves comparatively soft; the cauline with petioles averaging 4.5 cm. long *b.*
b Leaves cordate at base.
Leaves narrowly deltoid-ovate, tapering with straight sides from base to apex ..... *P. cordata*
Leaves broadly ovate, gradually curved from the broad base to the blunt summit ..... *P. cordata,* forma *latifolia*
b. Leaves truncate to tapering at base, narrowly deltoid to linear-lanceolate ..... *P. cordata,* forma *angustifolia*
a. Spike rather loose: young flowers glandular and sometimes hirtellous, not villous, glandular or glabrate in age: mature fruits 5–6 mm. long: seeds 2.7–3.2 mm. long, 1.8–2 mm. in diameter: leaves comparatively hard; the cauline with petioles averaging 2.7 cm. long *c.*
c. Leaves lance-oblong to lance-linear, narrowed at base .... *P. lanceolata.*
c. Leaves deltoid to ovate, truncate to cordate at base.
Leaves narrowly deltoid-ovate, tapering with straight sides from base to apex, truncate to shallowly cordate at base ..... *P. lanceolata,* forma *trullifolia.*
Leaves ovate, gradually curving from the broad deeply cordate base to the summit ..... *P. lanceolata,* forma *brasiliensis*

P. CORDATA L. Sp. Pl. i. 288 (1753). *Unisema cordata* (L.) Farwell, Pap. Mich. Acad. Sci. iii. 91 (1923).—Peaty, sandy or muddy shores, Nova Scotia to southern Ontario, south to northern Florida and Oklahoma.—Doubtless some of Rafinesque's proposed species of *Unisema* belong here but his descriptions are not detailed enough for definite identification.

Forma LATIFOLIA (Farwell) House, N. Y. St. Mus. Bull. No. 254: 207 (1924). *Unisema cordata,* forma *latifolia* Farwell, l.c. 92 (1923).—Usually in richer soils, and often want ng in the more silicious areas.

Forma ANGUSTIFOLIA (Pursh) Solms in DC. Monogr. iv. 532 (1883). *P. angustifolia* Pursh, Fl. Am. Sept. i. 224 (1814). Var. *angustifolia* (Pursh) Torr. Fl. N. and Mid. St. i. 343 (1824). *Unisema Purshiana* Raf. Med. Fl. ii. 107 (1830) and doubtless other spp.—Sandy or peaty shores, Prince Edward Island to Wisconsin, and southward east of the Appalachian system.

It is quite impossible from the meagre descriptions to say whether *P. lancifolia* Muhl. Cat. 34 (1813) and Ell. Sk. i. 382 (1817) belongs

[1] Solms in DC. Monogr. iv. 533 (1883).

here or with *P. lanceolata*. The description of the leaf applies to either, and neither Muhlenberg nor Elliott mentions the diagnostic characters. It is probable that *Unisema heterophylla* Raf. Med. Fl. ii. 108 (1830), "From New York to Louisiana" was based upon both this and the next.

P. LANCEOLATA Nutt. Gen. i. 216 (1818). *P. cordata*, var. *lanceolata* (Nutt.) Griseb. Cat. Pl. Cub. 252 (1866).—South Carolina to Texas and Paraguay. Since this species has been confused with *P. cordata*, forma *angustifolia*, it is desirable to cite characteristic specimens. GEORGIA: between Weycross and Ruskin, Ware Co., *Harper*, no. 1469. FLORIDA: Indian River, *Palmer*, no. 538; Duval Co., *Curtiss*, no. 2988,* *Fredholm*, no. 5126; South Jacksonville, April 7, 1897, *Churchill;* Eustis, Lake Co., *Nash*, no. 450. TEXAS: *Lindheimer*, no. 194. CUBA: "introduced" in river, Taco Taco, Pinar del Rio, *Wright*, no. 3260; Coloma, Pinar del Rio, *Britton & Cowell*, no. 9693. BRAZIL: Matto Grosso, *Leeson*. PARAGUAY: in regione cursus superioris fluminis Apa, *Hassler*, no. 7849.

Forma **trullifolia**, n. f., forma typica recedit foliis anguste deltoideo-ovatis basi truncatis vel subcordatis.—VIRGINIA: Point Micon Reach, *Tidestrom*, no. 82. NORTH CAROLINA: Spencer, July 12, 1919. *P. O. Schallert.* FLORIDA: Okeechobee region, Brevard Co., August 3, 1903, *Fredholm*, no. 5927 (TYPE in Gray Herb.); Eustis, Lake Co., *Nash*, no. 449. TEXAS: San Patrico, *Lindheimer*, no. 2516; Houston, *Lindheimer*.

Forma **brasiliensis** (Solms), n. comb. *Urisema acutifolia* Raf. Med. Fl. ii. 107 (1830) based upon the characteristic figure in Lam. Encyc. t. 225 (1793). *P. cordata*, forma *brasiliensis* Solms in DC. Monogr. iv. 533 (1883).—The following are characteristic. FLORIDA: without definite locality, *Chapman* (Bilt. Herb. no. 752*c*); Duval Co., *Fredholm*, no. 5237; Port Orange, *Straub*, no. 134; Fort Myers, *Hitchcock*, no. 354, *J. P. Standley*, no. 104. LOUISIANA: Gretna, *Ball*, no. 329. PARAGUAY: central Paraguay, *Morong*, no. 490; near Lake Ypacuray, *Hassler*, no. 12,683; Sierra de Maracayú, Hassler, no. 5363.

GRAY HERBARIUM.

POSSIBILITIES OF HYBRIDISM AS A CAUSE OF VARIATION IN POLYGONUM.

E. E. STANFORD.

DURING the last century a considerable number of hybrids within the subgenus *Persicaria* of the genus *Polygonum* have been reported in Europe. On the American side very little attention seems to have